JPRS-UEE-88-001
5 FEBRUARY 1988

FOREIGN BROADCAST INFORMATION SERVICE

JPRS Report

Science & Technology

USSR: Electronics & Electrical Engineering

Science & Technology
USSR: Electronics & Electrical Engineering

JPRS-UEE-88-001 *5 FEBRUARY 1988*

CONTENTS

Circuits, Systems

Transportation

Aerospace, Electronic Systems

Instrumentation

Electron Devices

Computers

Microwave Theory, Techniques

Communications

Sonics, Ultrasonics

Electromagnetic Compatibility

Power Engineering

Magnetics

Quantum Electronics, Electro-Optics

Solid State Circuits

UDC 621.396.962.25

Optimization of Parameters of Correlation Devices for Detection of Signals

18600179a Moscow RADITEKHNIKA in Russian
No 3, Mar 87 (manuscript received after revision 15 Jul 86) pp 18-21

[Article by V.V. Bessonov]

[Abstract] The article considers two simple methods of separating the basic lobe of a correlation function from the lateral lobe for signals, the spectrum envelope of which is close to a rectangular form. The first uses gating and the second two additional correlation channels for nonlinear signal processing. The methods can be used in a correlation detector for which a block diagram is shown. Figures 4; references 6: 5 Russian, 1 Western (in Russian translation).

1645/12232

UDC 621.396.62

Reception of Phase-Keyed Signals by Acoustooptic Convolver in Presence of Background Interference

18600139d Moscow RADIOTEKHNIKA in Russian
No 1, Jan 87 (manuscript received 4 Apr 86) pp 78-82

[Article by A.S. Gurevich and G.S. Nakhmanson]

[Abstract] Reception of phase-keyed binary signals through an acoustooptic convolver in the presence of stationary normal background interference n(t) is analyzed, this interference assumed to have a zero mean value and a correlation function $n(t_1)n(t_2) = K(t_1 - t_2)$. The convolver consisting of two identical ultrasonic light modulators, one behind the other, is followed by an integrating lens and then a photodetector in the focal plane of the later. The photodetector feeds electric output signals through a selective amplifier to a synchronous detector. The convolver is assumed to operate in the Bragg diffraction mode, a plane light wave entering the first modulator and a reference signal entering the second one. The signal-to-noise ratio at the receiver output is calculated on this basis, first analytically for an ideal amplifier with a rectangular frequency characteristic and a synchronous detector with two channels in phase quadrature. It is then calculated numerically for signals with Barker code or random code keying. The results indicate that the maximum signal-to-noise ratio depends on the ratio of optical signal recording time to light pulse duration. Figures 4; references 6: 5 Russian, 1 Western.

2415/12232

UDC 621.391.83

Digital Demodulation of Frequency-Modulated Signal

18600139 Moscow RADIOTEKHNIKA in Russian
No 1, Jan 87 (manuscript received after revision 23 Jul 86) pp 54-57

[Article by A.M. Movshovich]

[Abstract] Digital demodulation of FM signals by way of discrete Hilbert transformation is considered, under conditions of not necessarily constant amplitude and small frequency deviation of the Kotelnikov theorem not necessarily applicable. The demodulator consists of three stages, with a computer between the input analog-to-digital converter and the output digital-to-analog converter. The algorithm of demodulation involves summation of an infinite number of terms and its accuracy therefore depends on the number of terms retained as well as on the computer precision. In the case of an input signal with the constant instantaneous frequency and without amplitude modulation the error caused by truncation of the infinite sum depends on the subcarrier phase, which fluctuates, at the time of signal reading t=kT (T-discretization interval in the analog-to-digital converter). For a specific application such as demodulation of the color subcarrier in the SECAM television system, or any other specific case, this algorithm cannot be sued as is but must be optimized with respect to accuracy. This is achieved by use of a "time window" (Hemming, Henning, Bartlett, Blackman). Figures 4; references 6: 1 Russian, 5 Western (2 in russian translation).

2415/12232

UDC 621.391

Correlational Sine-Cosine Processing of Signals in Real Receiver

18600139a Moscow RADIOTEKHNIKA in Russian
No 1, Jan 87 (manuscript received after revision 5 Aug 86) pp 20-22

[Article by I.V. Gindler and V.G. Petnikov]

[Abstract] Correlational sine-cosine detection and extraction of signals with unknown initial phase is analyzed, considering that a real receiver for this purpose has a finite interference immunity. As performance criterion for such a sine-cosine receiver serves the peak output signal-to-noise ration, which indicates how much interference immunity is lost, assuming that only linear distortions of a signal occur in the channel. Figures 1; references 2: 1 Russian, 1 Western.

2415/12232

UDC 621.396.967

Effectiveness of Target Detection by Radar with Synthesized Aperture
18600139b Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 pp 23-24

[Article by L.G. Dorosinskiy, A.R. Kurov]

[Abstract] The effectiveness of target detection by a radar in the presence of external interference sources is characterized by the signal-to-interference ratio at the output of the signal processing channel. This parameter is calculated for a radar with synthesized aperture on the basis of relevant system characteristics, the system consisting of transmitter and receiver radar as well as target and interference sources. This parameter, essentially constituting a performance improvement coefficient, depends on the effective scattering surface area of the target but not on the energy characteristics of radar transmitter-receiver set and of interference sources. It therefore is a universal radar effectiveness characteristic which accounts for the degree of correlation between interference signals, the form of weighting function in the signal-processing channel, and the form of radiation pattern of not only transmitter and receiver antennas but also of interference sources.

2415/12232

UDC 621.372.54:621.382.323

Signal Frequency Filtration Using Input Devices with Charge Coupling
18600125a Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 31, No 12, Dec 86 (manuscript received 4 Apr 85) pp 2475-2482

[Article by Yu.R. Vinetskiy]

[Abstract] The article shows that the frequency properties of the input devices (ID) if instruments with charge coupling (ICC) make it possible to place the function to frequency filtration on the ID, thereby simplifying the construction of a number of similar devices based on ICC. Based on the example of two types of ID, it is shown that the ID can accomplish quasi-optimum band filtering of signals. Mechanisms are considered for forming lower and upper boundaries of the frequency in the indicated ID as well as their amplitude frequency characteristic (AFC), and the effect of time sampling. Experimental confirmations of the proposed model of the AFC are presented. The author thanks M.A. Trishenkov for helpful critical remarks and G.B. Kobrin for assistance in measuring the AFC. Figures 5; references 7: 6 Russian, 1 Western.

6415/12232

UDC 621.391.83

Digital Demodulation of Frequency-Modulated Signal
18600139 Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 23 Jul 86) pp 54-57

[Article by A.M. Movshovich]

[Abstract] Digital demodulation of FM signals by way of discrete Hilbert transformation is considered, under conditions of not necessarily constant amplitude and small frequency deviation of the Kotelnikov theorem not necessarily applicable. The demodulator consists of three stages, with a computer between the input analog-to-digital converter and the output digital-to-analog converter. The algorithm of demodulation involves summation of an infinite number of terms and its accuracy therefore depends on the number of terms retained as well as on the computer precision. In the case of an input signal with the constant instantaneous frequency and without amplitude modulation the error caused by truncation of the infinite sum depends on the subcarrier phase, which fluctuates, at the time of signal reading t=kT (T-discretization interval in the analog-to-digital converter). For a specific application such as demodulation of the color subcarrier in the SECAM television system, or any other specific case, this algorithm cannot be sued as is but must be optimized with respect to accuracy. This is achieved by use of a "time window" (Hemming, Henning, Bartlett, Blackman). Figures 4; references 6: 1 Russian, 5 Western (2 in russian translation).

2415/12232

UDC 621.391:621.837:621.397.2.037.372

Multidimensional Spatial Digitization of Television Images

18600174b Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received after revision 11 Jul 86) pp 6-9

[Article by A.A. Borodyanskiy]

[Abstract] The article investigates the problem of hypertrigonal digitization of an image as an essentially multidimensional function of space-time coordinates and also of the intensity and chrominance coordinates. The characteristics are obtained of n-dimensional interpolating filters, which regenerate an image according to its readings. The approach proposed represents a reliable theoretical base for optimizing the process of discrete representation of images. References 8: 7 Russian, 1 Western.

6415/12232

UDC 778.534.48

Studio Tape Recorder for Duplicating Synchronized Sound Tracks

18600152e Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 10, Oct 86 p 59

[Article by V.M. Lukoyanychev and O.M. Sidamonidze, Georgian Republic Radio and Television Center]

[Abstract] The R7/a cassette tape recorder produced in Hungary is widely and successfully used for synchronized audio recording with mobile film cameras for field reporting work. However this tape recorder does not have facilities for copying the tape and attempts made at several radio and television centers to fabricate adequate copying devices have not been successful. A studio tape recorder for duplicating tapes based on the R7 tape recorder was developed at the Georgian Republic Radio and Television Center. A block diagram is given and described. Figure 1.

12497/12232

UDC 778.533.6-83

Electric Drive with Quartz Frequency Stabilization for Kinor Film Camera

18600152d Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 10, Oct 86 pp 57-58

[Article by A.Ye. Vorobyev, Moldavian Republic Radio and Television Center]

[Abstract] At the Moldavian Republic Radio and Television Center, the 16-mm Kinor film camera is used with the Reporter-6 tape recorder which are connected by a 5 - 10 m cable for pilot signal transmission and frequency stabilization is required. However series produced quartz stabilized electric drives are not always available or are not of the required quality. A block diagram for a quartz frequency stabilization electric drive designed for the Kinor is shown and discussed and performance data are given. The design is simple, reliable because of digital processing of the control signals and utilizes the series produced 29EPSS electric drive. The unit was successfully tested on 32 Kinor cameras for 3 months. Figure 1; reference: 1 Russian.

12497/12232

UDC 681.8.534:621.397.618

Use of Panel-Type Sound Absorbers in Television Studios

18600152c Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 10, Oct 86 pp 43-44

[Article by M.Yu. Lane, All-Union Television and Radiobroadcasting Scientific Research Institute]

[Abstract] Television studios are now generally soundproofed by installing acoustically prepared wood facings on wooden framing (with a surface of 90-300 m^2) on walls and ceilings. New studios built for color television utilize more powerful lighting equipment and because of fire hazards the room framing is metallic and wood acoustic facing is no longer used. Soundproofing of the ceiling is especially difficult and the article describes the use of stiff sound absorbent panels covered with glass cloth suspended from the ceiling. The recommended design shown consists of 11 rows of panelling 1.05 m apart. the rows are made of 1000 x 1000 x 100 mm modules and each module consists of two panels fitted together and covered with glass cloth. The modules are suspended 700 mm form the ceiling. The design is light and easily installed. Its efficiency was demonstrated by the reconstruction of the S-300 TV studio of the Irkutsk Radio and Television Center and reverberation frequency characteristics are given for the studio. The suspended panel method was found to be satisfactory in practice for studios although the results did not conform to the reverberation time frequency characteristic standard. Tests were performed by the Scientific Research Institute for Construction Physics, USSR State Committee for Construction Affairs. Figures 2; references: 3 Russian.

12497/12232

UDC 621.385.832.564.4

Research on Dynamic Range of Vidicons in Pulse Mode Operation

18600152b Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 10, Oct 86 pp 40-42

[Article by V.P. Klimashin, L.F. Lysyuk and I.A. Preobrazhenskiy, All-Union Motion Picture and Photography Scientific Research Institute]

[Abstract] Image distortions due to the nonlinearity of camera tube responses are especially undesirable in measurement systems using TV technology. The signal-/noise ratio at the camera output is the decisive factor in

image precision and this is determined by the amplifiers rather than by the camera tube mosaic. The dynamic ranges of the USSR LI-450, LI-457 and Japanese Hitachi 8758A were studied at various illumination intensity levels in pulse mode at the wavelength of 544 nm. A block diagram of the experimental layout utilizing an S9-1 oscillograph, a digital voltmeter and an IFK-50 pulse lamp or an oscilloscope as a pulse source is given. Although the results showed that noise levels for various illumination intensities remained approximately the same over the entire light characteristic range for all the vidicons, it is not possible today to attain a high level of linearity of the light characteristic over the entire range because of amplifier noise. A satisfactory linear response for measurement purposes is possible only over 25-35 percent of the video signal light characteristic range and the nonlinearity in this range will then not exceed .15-.3 percent. Figures 5; references: 3 Russian.

12497/12232

UDC 621.397

Mathematical Description of Space-Time of Television Image
18600139k Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 23 Jun 86) pp 17-20

[Article by O.V. Gofayzen and A.V. Mindel]

[Abstract] The raster formation process and the resulting space-time structure of a television image consisting of horizontal lines in a digital television system is described in a rigorous mathematical form applicable particularly to a system with solid-state signal transducers. The description is based on horizontal motion of an oblique point array and it includes the scanning process. The description is obtained with the aid of a discretization function, using also the Fourier transform of the space-time pulse response of an image-synthesizing element and the frequency characteristic of the electrical channel. Figures 2; references: 1 russian.

2415/12232

UDC 681.775.7:621.397.132

Television Projectors with Oil Medium
18600152a Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 10, Oct 86 pp 31.39

[Article by Yu.P. Gushcho, Moscow Institute of Radio Engineering, Electronics and Automation]

[Abstract] At the present time commercially viable large-screen television systems are of two types. The first utilizes a lense system to enlarge the image on the luminescent screen of the picture tube with a 7-15 cm diagonal so as to project an image of up to 2 m^2. However physical limitations preclude further enlargement. The second, or Eidophor type, is discussed which uses a deformable oil medium screen whose principle was invented by Fischer. The oil medium screen replaces the luminescent screen of the CRT by a deformable oil medium light valve which can retain a signal for a period of one frame which is located before a lense system and projection screen. The Eidophor principle is used for black and white and color large screen projectors (1 - 240 m^2) and also for space-time light modulators in coherent processors where it be used to generate relief-phase rather than the less effective amplitude transcriptions while data input is handled at television speeds. The large-screen projectors can be used for auditoriums, control of industrial processes, remote sensing of small-scale or inaccessible events and for simulation equipment. Currently available equipment is reviewed (4 Western units and the USSR Ariston). The principle of the system, characteristics of the light deformable medium and relief imaging characteristics and generation are discussed. The circuit of the US PJ-5000 unit is described. Figures 7; references 12: 6 Russian, 6 Western (2 in Russian translation).

12497/12232

UDC 621.355.84:621.354.322.078

Memory-Based System of Automatic Silver-Zinc Storage Battery Charging and Discharging
18600113e Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 2, Feb 87 pp 48-49

[Article by V.S. Vasilyev and O.N. Tsybulskiy, Sochinskiy Radio and Television Center]

[Abstract] A system of automatic charge and discharge of silver-zinc (SZ) storage batteries was developed and put into operation at the Sochinskiy Radio and Television Center. The system makes it possible to charge and discharge SZ storage batteries with control of the duration of charge and discharge, as well as their capacities, which made it possible to complete a battery of storage batteries with identical capacitance. Operational tests of the system showed its high reliability, and assured operation of the SZ storage batteries during filmings. At a competition of innovator proposals this development obtained third prize and a recommendation of the State Professional-Technical Academy, State Committee of the Council of Ministers of the USSR concerned with Television and Radio Broadcasting. Figures 1; references: 4 Russian.

6415/12232

UDC 681.7.067.252.6:621.397.13

New Television Lens with Variable Focal Length
18600113c Moscow TEKHNIKA KINO I TELEVIDENIYAinRussianNo 2, Feb 87 pp 22-25

[Article by L.I. Samsonova and I.A. Blyumina, All-Union Scientific Research of Television and Radio Broadcasting]

[Abstract] The article considers the overall and aberration parameters of the new television variable lens OTsT 10 x 10 M with a 10^x focal range. Technical data are presented on the OTsT 10 x 10 M, as well as on the transmission coefficient of modulation of the lens for a frequency of 30 line/mm.

6415/12232

UDC 621.397.61: VM

Differential Distortions in Video Tape Recorders
18600113d Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 2, Feb 87 pp 25-29

[Article by A.V. Goncharov and M.I. Kharitonov, All-Union Scientific Research Institute of Television and Radio Broadcasting]

[Abstract] This article describes the major reasons for a differential distortions in video tape recorders. Methods for their compensation and measurement are considered. Video tape recorders which record composite color signals are used for the most part in television broadcasting. Joint transmission in one channel of brightness and chromaticity signals considerably increase the requirements on the characteristics of such a channel, and particularly to those of them which determine television crosstalk distortions of brightness/chrominance, subdivided into differential gain (DG) and differential phase. Differential distortions appreciably affect the quality of the reduced image of SECAM: e.g., DG can worsen the signal-to-noise ration in the chromaticity channel. In combination with other forms of distortions and noise they can lead to the appearance of flares on an image. Figures 5; references: 5 Russian.

6415/12232

UDC 534.86+621.395.61

Improvement of Balanced Inputs to Electroacoustic Devices
18600113b Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 2, Feb 87 pp 12-16

[Article by V.M. Potapova and E.P. Tarasov, Central Design Bureau, Ekran Scientific Production Association]

[Abstract] Improvements are considered for balanced inputs which, with the use of transformer, make it possible to decrease considerably the dimensions and cost of the latter and at the same to increase the quality of the electroacoustic device. With galvanic decoupling, the organization of linear and mixer inputs assures a very high overload capacity with respect to input and a very small distortion over a wide range of frequencies. The development of microphone amplifiers with a new circuit diagram of the input transformer demonstrated that it is possible to obtain a low noise level with the use of conventional integrated operational amplifiers by means of an increase in the transformation ratio. Figures 6; references 4: 2 Russian, 2 Western.

6415/12232

UDC 778.53.002.658.562

Method for Evaluation of Quality Indices of Cinema Equipment
18600113a Moscow TEKHNIKA KINO I TELEVIDENIYA in Russia No 2, Feb 87 pp 8-12

[Article by L.V. Brykin, N.M. Prokofyeva, and A.V. Sokolov, Leningrad Institute of Cinema Engineers]

[Abstract] The article proposes a method for determining the quality indices of cinema systems such as resolution, nonlinear distortion, instability, film speed variation, film skipping which makes it possible qualitatively and quantitatively to reveal the effect of each of perturbation factors. On the basis of this method it is possible to determine the weight of each of the perturbation factors, and already at the stage of designing to draft a way of providing for the required quality indices of cinema equipment. Figures 1; references: 7 Russian.

6415/12232

UDC (621.371.32:538.552.2)001.24

Design of Noncoaxial Homogeneous Shields

18600139i Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 pp 77-78 [Annotation of article no 937-sv deposited at Central Scientific and Technical Institute 'Informsvyaz,' 13— with 3 figures and 9 biological references]

[Article by S.M. Apollonskiy]

[Abstract] A design method is proposed for multilayer shielding shells made of homogenous material with layers not exactly coaxial or concentric because of technological imprecision. Such shells, in the Rayleigh approximation, are bounded by coordinate surfaces which satisfy the conditions $h_{xe} = 1$ and $^{gd}/gd_{xe}(h_{x1}/h_{xk} - 0$ (h_{hgb} - Lame coefficients, gb=e,l,k - sequence of indices. The method involves solving the Laplace equation for the magnetic scalar potential by reduction to a canonical infinite system of algebraic equations. The method is applicable to physical arrays of layers one inside another with generally not coinciding axes or centers in a homogeneous isotropic medium with magnetic permeability $gm_0 = 4\text{-}.10^{-7}$ H/m and electrical conductivity $gd_0 0$. It is demonstrated on the design of a spherical shielding shell. Presence of a metallic inclusion inside the shell cavity must be taken into account.

2415/12232

UDC 621.396.670

Comparative Performance Evaluation of Integral Equations and Basis Functions Used for Numerical Solution of Problems Concerning Thin Curvilinear Wire Radiators and Specifically Their Current Distribution and Input Impedance

18600139h moscow RADIOTEKHNIKA in Russian No 1, Jan 87 pp 76-77

[Article by I.A. Dokukov]

[Abstract] Three integral equations (Pocklington, Mei-Hallen, Harrington) and two kinds of basis functions (piecewise constant, binomial piecewise-sinusoidal) used for numerical solution of antenna boundary-value problems, specifically for simple and bifilar helical antennas, are comparatively evaluated for application to thin curvilinear radiators, calculation of their current distribution and input impedance by the method of finite segments. Binomial piecewise-sinusoidal basic functions and the Harrington integral equation are found to be preferable when M /- 200, M denoting the dimensionality of the matrix of generalized impedances, piecewise-constant basis functions and the Pocklington integral equation are found to be preferable when MThe author thanks A.V. Runov for assistance and valuable comments.

2415/12232

UDC 621.396.67(024)

Use of Multiple Compensation in Short-Wave Antenn.' Arrays

18600139g Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 30 Jun 86) pp 73-76

[Article by V.B. Braude and A.Z. Fradin]

[Abstract] Multiple compensation of reflections in cophased horizontal wideband short-wave antenna arrays is examined, its purpose being to increase the traveling-wave coefficient in the main feeder and better matching of wire dipoles with feeder lines. Appropriate linear dephasing of dipole groups is considered in preference to insertion of special transformers. Accordingly, such an antenna array consisting of $N\text{-}2^k$ (k- integer) dephased vertical sections is designed with symmetric feed of each and parallel feed of all, dephasing of horizontal sections have been considered by other authors. The basic dimensions correspond to those of an SGD 4/8 antenna array and the calculated performance characteristics indicate the feasibility of multiple compensation by this method. Figures 4; references: 6 Russian.

2415/12232

UDC 621.396.67

Effect of Finiteness of Substrate Dimensions on Radiation Pattern of Microstrip Antenna

18600139f Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision pp 63-67

[Article by A.F. Chaplin and Ye.M. Yashchishin]

[Abstract] The radiation pattern of microstrip antenna on a dielectric substrate is calculated, taking into account the edge effect due to finiteness of the substrate dimensions. Exact boundary conditions at the dielectric surface are replaced with impedance conditions, the model of an antenna in the approximation being an infinitely large plane with isotropic surface impedance above the substrate and zero impedance beyond it. Calculations are made for a two dimensional impedance model of such an antenna excited by surface waves. An exact analytical solution to the excitation problem for an impedance strip is not known, diffraction of surface waves by the strip edges being evidently significant enough to be included. An approximate numerical solution has been obtained with the aid of a computer, the results agreeing closely with experimental data. Figures 5; references: 4 Russian.

2415/12232

UDC 621.396.96

Limit of Noncoherent Storage in Telescopic Radar with Synthetic Aperture

18600100a Moscow RADIOTEKHNIKA in Russian No 12, Dec 86 (manuscript received after revision 30 Jun 86) pp 13-16

[Article by V.P. Sedyakin]

[Abstract] A telescopically scanning radar with synthetic aperture is considered, continuous antenna position control for continuous coverage of one target surface area ensuring high-quality surveillance. Noncoherent storage of radio images for a smoother pattern evolution can yield a high signal-to-noise ratio not attainable by coherent storage. For a design and performance analysis, with superposition and summation of images included in the signal processing algorithm, the limit attainable by noncoherent storage is determined on the basis of standard relations in the approximation of plane scanning. Depending on the radar-target geometry and the radar aperture characteristics, a gain of 2-10 in the signal-to noise ratio is found to be feasible by noncoherent image storage (Npairs of stored images 0.2 X 2.0 km length of synthetic aperture, h 100 km flight altitude, P – 20 km minimum distance on target surface from projection of radar platform trajectory to surveyed area). Figures 2; references 6: 5 Russian, 1 Western (in Russian translation).

2415/12232

UDC 621.396.96:621.396.67

Comparison of Potential Characteristics of Detection on Radar Systems

18600139i Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision [illegible]) pp 3-5

[Article by V.K. Cheremisov]

[Abstract] The article investigates the possibility of [illegible] probability characteristics for detection of [illegible] creating conditions for its observation by [illegible] shadow scattering field. This is done by [illegible]on of the receiving antenna array and the [illegible]paration of the fragments so that angular [illegible]f the order gl/d_x are achieved with reference [illegible]e position of the object, when d_x is a typical dimension of the object: gl is the wavelength (gl d_x. The greatest power gain in a multiposition radar system is obtainable in applications where detection must be very reliable under condition of a priori uncertainty concerning orientation, form, and coating of the object. Figures 2; references: 10 Russian.

6415/12232

UDC 621.391.16

Estimating Relative Boost of Energy Potential in Laser Radar Facility Necessary for Compensation of Modulating Atmospheric Interference

18600139j Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 pp 84-85 [Annotation of article No 951-sv deposited at Central Scientific and Technical Institute 'Informsvyaz,' 5 pp with 5 bibliographical references]

[Article by V.P. Kostin]

[Abstract] The necessary boost of the energy potential in a laser radar facility for compensation of modulating atmospheric interference, to ensure reliable detection of optical signals, is estimated relative to the intrinsic energy potential as reference level. The estimate is based on an exponential dependence of the necessary boost on the dispersion of the logarithm of signal energy and on the probability integral. With a maximum dispersion gd^2=0.64 in sufficiently long near-surface channels, a 0.9 or higher probability of detection should be attainable if the energy potential of the ground communication channel is boosted to a more than 3.9 times higher one.

2415/12232

UDC 621.372.412

Theoretical Basis of Oscillations of Piezoelectric Resonators Operating with Contour-Shift Modes
18600174c Moscow RADIOTEKHNIKA in Russian No 3, Mar 87, pp 37-39

[Article by V.S. Samoylov, I.I. Postinkov, and M.V. Mironova]

[Abstract] The article considers the basis of the theory of oscillations of quartz resonators, the piezoelectric elements of which perform contour-shift oscillations. Such piezoelectric resonators are widely used in generators and filters operating over a large interval of temperature variations with high requirements for frequency stability. Figures 3.

6415/12232

UDC 621.396.62

Use of Logic Gates in Functional Modules of Receiver System
18600139l Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 14 May 86) pp 13-17

[Article by O.A. Khandzyan]

[Abstract] The circuit design of several digital functional modules with logic gates fora a receiver system is analyzed and their mode of operation is described. One such module is a wideband amplifier consisting of two AND inverter stages and a transformer either in series between them or in parallel across the first one. Another such module is a comb filter consisting of several stages with AND gates and a shifting circuit with delay lines, no capacitors and inductors. Logic conversion at teach quantization level is effected here by an AND-OR inverter pair, delay lines being also replaceable by AND and OR gates. Demodulation of an FM signal without conversion to AM is demonstrated, the demodulator consisting of a frequency-division counter with a reference-pulse generator, two AND coincidence circuits, a trigger, a pulse counter with a reference-pulse generator, and a register. Extraction of the envelope and amplification of this low-frequency signal can be effected by means of a conventional decoder and additional logic gates. All these modules can be designed for large-scale integration and for operation alone or with classical modules. Figures 7; tables 1; references 8: 7 Russian, 1 Western.

2415/12232

UDC 621.397.6.001.66

Problem of Solvability of Automatic Synthesis of Designs of Television Equipment
18600113f Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 2, Feb 87 pp 17-22

[Article by Ye.K. Chigarov, All-Union Scientific Research Institute of Television]

[Abstract] The article considers the conditions for computer-aided design of television equipment which can be fabricated by programmable controlled production equipment. Object characteristics must be expressible in an appropriate formal language. Description in terms of genotype predicates must be possible by means of finite sets. Synthesis functions must be reducible to partially recursive functions. Possible value for fabrication must be possible predicates of the genotype nucleus. Contradictions appearing during automated design indicate the existence of local expressions describing structural elements. References: 10 Russian.

6415/12232

UDC 621.335:621.313.13

Method for Selection of an Electromagnetic Suspension System

18600120f Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA in Russian No 1, Jan 87 (manuscript received after revision 10 Sep 86), pp 78-81

[Article by Valentin Dmitriyevich Nagorskiy, doctor of technical sciences, professor, Moscow Institute of Railroad Transport Engineers, and Sergey Vasilyevich Chernov, senior scientific worker, Moscow Institute of Railroad Transport Engineers]

[Abstract] The article presents a procedure for selection of an electromagnetic suspension system based on a general optimized one-stage procedure for adaptation of a solution. The procedure is demonstrated on variations of autonomous systems of electromagnetic suspension with gp-shaped electromagnets. The nonlinear programming optimization problem is solved numerically by an algorithm of variable tolerance. Figures 1; references: 4 Russian.

06415/06662

UDC 621.396.969

Measuring Characteristics of Sea Ripple with Ship Radar

18600139e Moscow RADIOTEKHNIKA in Russian
No 1, Jan 87 (manuscript received 14 Apr 86 pp 8-10

[Article by I.Ye. Ushakov, L.V. Yevteyeva, S.A. Kachinskiy, and A.F. Kulikov]

[Abstract] Two parameters of sea ripple, mean wave crest height and mean surface slope angle, were measured with a Mius navigational radar on a ship moving at speeds of 0-12 knots while the sea ripple varied over the 1-4 points range on the roughness scale. The instrumentation for such a contactless measurement included, in addition to the radar transceiver, an antenna-waveguide system with transfer switch and a lock-in device, a single-channel generator of probing pulses, a generator of standard microwave signals, a ferrite circulator with absorbing load, two envelope detectors, a two-channel generator of measuring pulses, a magnetic sound recorder, and a Pierce computer-aided data processing system. Probing pulses of 0.3 us duration were used for the measurements, echo signals arriving at 3° and 1.5° angles after reflection by water surface segments respectively 300 m and 600 m away from the ship being picked up for processing. The results indicate that the ripple parameters are determined with minimum error when fluctuation frequencies of echo signals are measured over the most likely time interval between two successive average-level crossovers by the envelope rather than when its mean fluctuation frequency is measured. Figures 2; references: 4 Russian.

2415/12232

UDC 531.383

Two-Gyroscope Compass

Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 8 Jan 1986) pp 40-44

[Article by L.I. Kargy, Ye.G. Kizlov, and V.I. Rybakov, Leningrad]

[Abstract] A theoretical and experimental investigation is made of the scheme of a gyrocompass constructed on the basis of the two angular velocity pickups with direct reduction of a platform into the plane of a meridian. It is shown that a two-gyroscope compass, built with gyroscopes, the technical characteristics of which are approximately identical, or differ by less than 50 percent, have a higher speed of response and precision as compared with one-gyroscope schemes for gyrocompasses. Figures 2; references 5: 4 Russian, 1 Western (in Russian translation).

6415/12232

UDC 531.383-522.4

Error from Inertial forces of Plotting Device of Stellar System of Coordinates in Astronavigation System

18600118b Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 3 Mar 86) pp 44-50

[Article by V.I. Yushchenko, M.A. Sergeyev, V.A. Levanenko, and T.N. Rysakova, Leningrad Institute of Precision Mechanics and Optics]

[Abstract] Algorithms are presented with which a standard program is composed for a computer which calculates the mean-square error of the plotting device for a stellar system of coordinates (SSC) from inertial forces during the steady-state movement of an object. It is shown that the mean-square error of the SSC employed for determination of the angular coordinates of an object is substantially smaller than an analogous error in pilot instruments with pendulum-correctors. The article is recommended by the Department of Onboard Control Instruments. Figures 3; references: 5 Russian.

6415/12232

UDC 621.317.726.089.52:681.7.068.621.39

Digital Measurement of Amplitude of Pulses of Electric Field With Automatic Calibration of Sensitivity
18600146e Moscow IZMERITELNAYA TEKHNIKA in Russian No 2, Feb 87 pp 44-45

[Article by V.B. Buber, Yu.A. Pivovarov, and A.A. Sokolov]

[Abstract] The article describes a self-calibrating measurer of the pulses of an electrical field which was developed with the object of decreasing errors of measurement. Together with this decrease, a reduction is achieved of the build up time of the device's transient response to 50 nanosecond. The device consists of a measurement transducer, an optical fiber link and a recorder. A block diagram of the device is shown. Figures 1; references: 2 Russian.

06415/06662

UDC 621.372

Procedure for Data Processing in Logarithmic Time Scale
18600174j Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received after revision 24 June 1986) pp 60-62

[Article by V.L. Odivanov and Yu. A. Gusev]

[Abstract] The article considers a method of obtaining the frequency response of a lineary system, the reaction of which in time with the standardized aperiodic effect may be represented by the sum of exponents. A table is presented of the coefficients of a transforming filter and a procedure for their calculation. The proposed method of processing is applied during transformation of the function of a dielectric response obtained on a spectrometer used for determining the dispersion spectra. References 2: 1 Russian, 1 Western.

06415/06662

UDC 621.396.677.71.536.5

Evaluation of Temperature Characteristics of Slot Radiators
18600146d Moscow IZMERITELNAYA TEKHNIKA in Russian No 2, Feb 87 pp 39-40

[Article by V.I. Matveyev]

[Abstract] The article considers the temperature characteristics of a slot radiator consisting of a temperature wedge and a linearly moving slot placed before it which is used as a calibrator during certification and tests of scanning infrared systems. During conducting of thermovisual measurements employing a temperature wedge and a slot radiator it is recommended that a temperature wedge be used with a small temperature gradient with respect to the working surface, and that a slot be used witn a small width and to place it in the area of a more elevated temperature of the wedge. Figures 2; references: 2 Russian.

06415/06662

UDC 535.6.088.2:001.8

Evaluation of Error in Determining Chromaticity Coordinates of Objects
18600146c Moscow IZMERITELNAYA TEKHNIKA in Russian No 2, Feb 87 pp 27-29

[Article by V.I. Lagutin]

[Abstract] Formulas are proposed for calculation of the systematic and random components of the errors of indirect measurements of the chromaticity coordinates of objects. It is shown that the component errors of such measurement are individual to each measured object and in the general case cannot be used as standardized characteristics of light-measuring instruments. References: 2 Russian.

06415/06662

UDC 531.74.087.92.082.1.082.5

Construction Principles of One Class of Analog-to-Digital Converter of Spatial Position
18600146b Moscow IZMERITELNAYA TEKHNIKA in Russian No 2, Feb 87 pp 8-10

[Article by K.I. Bogatyrenko]

[Abstract] The principles of construction of a multicoordinate optical-mechanical converter considered in this article make it possible to expand the functional possibilities of current scanning analog-to-digital converters (ADC) and to utilize them for the measurement of spatial position. The precision of measurement is determined by errors of an angle-code converter scanning of a light beam. The error of determining the coordinates on a plane is estimated not to exceed 10 micrometer for the displacement range of 500 mm with a 20-second error of measuring angles. For the range of linear displacement of 100 mm and 3SD angles, an error of ADC of the space position of not more than 5 micrometer (for coordinates of the centers of scan) was experimentally confirmed. Figures 2; references: 10 Russian.

06415/06662

UDC 681.2.088

Modernization of Method for Determining Interval Estimates of Error of Digital Instruments
18600118m Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian Vol 30, No 1, Jan 87 (manuscript received 3 Oct 1985), pp 12-14

[Article by G.P. Shlykov, Penzenskiy Polytechnical Institute]

[Abstract] The article considers a method for increasing the precision of an experimental evaluation of the limits of random errors of digital measuring instruments (DMI) whose total error includes quantitization, systematic as well as random components. This method makes it possible, without change of the experimental procedure or with small changes, to increase considerably determination of the interval values of the error of DMI during their testing. The article is recommended by the Department of Information Measurement Technology. Figures 1; references: 5 Russian.

06415/06662

UDC 681.586:621.386

Position-sensitive X-radiation Transducers
18600112j Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 p 31

[Article by A.I. Ader and D.A. Goganov, candidates of technical sciences, and D.N. Klimenskay, A.G. Lebedev, I.P. Lepik, and R.V. Markova, engineers]

[Abstract] The article presents the basic technical characteristics of the RKD-1 type position-sensitive x-radiation transducer which uses a NAV-1 resistance filament anode. Position-sensitive X-radiation transducers and instruments developed on their basis have applications in geology, scientific research, criminology and silicon and germanium crystal testing. Figures 1; references: 4 Russian.

06415/06662

UDC 621.757.008:658.82.011.56

Small Instrument System
18600112i Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 19-21

[Article by Candidates of Technical Sciences V.V. Sumin and A.B. Kislitsyn and engineers V.I. Vorobyev and A.G. Savin]

[Abstract] The article describes the prototype of a specialized microcomputer system designed for realization of portable measuring instruments of low and medium complexity. Figures 2; references: 4 Russian.

06415/06662

UDC 550.834

New Instrument for Geophysical Sampling of Ferrous Metal Ores, the RSK-102
18600112h Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 30-31

[Article by Engineers D.A. Yegorova, V.V. Nadymov, A.L. Pavlov, K.G. Timerayev, S.F. Fedorov, and A.Ye. Filippov]

[Abstract] The article describes and lists the principal technical characteristics of the RSK-102 scintillation mining instrument used for geophysical sampling of ferrous metal ores by measurement of the large-scale share of iron and other elements in ores and the products of their enrichment at enterprises of the Ministry of Ferrous Metallurgy. Experimental-constructional work on the RSK-102 was completed in 1985. Figures 2; references: 3 Russian.

06415/06662

UDC 539.216.1:546.28:531.787

Miniature Pickup of All-round Pressure
18600112g Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 29-30

[Article by A.I. Drozhzhin and A.A. Shchetinin, candidates of physicomathematical sciences and A.P. Yermakov, engineer]

[Abstract] The article describes a small pickup using a silicon crystal whisker as a primary converter. It is used for measurements of the all-round pressure of liquid and gaseous media in the $0\text{-}10^5$ pascal range. It can also be used for operational control of the blood pressure of the human body. Figures 1; references: 3 Russian.

06415/06662

UDC 681.26:681.325.5-181.4

Application of Special Use Microcircuits in Scales Equipment
18600112f Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 15-16

[Article by Yu.M. Sergiyenko, director, Scientific Research and Design Institute for Testing Equipment, Instruments, and for Mass Measurement Devices, A.P. Rakayev and Yu.S. Pliskin, candidates of technical sciences]

[Abstract] The article is concerned with the problem of creating electromechanical scales which have the same precision (or better) than mechanical scales, but free from their deficiencies. The steps taken in the creation of

a scale with high-speed, output into an automatic control system and equal with respect to cost to mechanical devices are described. References: 2 Russian.

06415/06662

UDC 622.625.28-83

Electrodynamic Braking of Mine Electric Locomotive
Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA in Russian No 1, Jan 87 (manuscript received after revision 24 Aug 87) pp 107-110

[Article by Mark Vasilyevich Chashko, candidate of technical sciences, scientific worker, Donestsk Polytechnical Institute]

[Abstract] An experimental check is performed on the drive of a mine electric locomotive in a dynamic braking regime, and a source of proneness to accident is shown. A circuit with cutoff is proposed, and the results are presented of an experimental and theoretical investigation of this circuit. The circuits are shown of electrodynamic braking with feedback and with cutoff. Figures 2; references: 2 Russian.

06415/06662

UDC 621.039.546.3

Combined Flaw Detector for Inspection of Surface of Cylindrical Articles
18600120b Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA in Russian No 1, Jan 87 (manuscript received after revision 6 May 85) pp 82-86

[Article by Nikolay Fedorovich Nikitenko, candidate of technical sciences, senior scientific worker, Novocherkassk Polytechnical Institute, Nikolay Nikolayevich Luksa, senior scientific worker, head of division, Novocherkassk Polytechnical Institute, Anatolin Leontyevich Shmal, post-graduate student, Novocherkassk Polytechnical Institute, and Pavel Grigoryevich Vinichenko, engineer, Novocherkassk Polytechnical Institute]

[Abstract] The article considers the block diagram of a flaw detector, equipped with eddy current and photoelectric transducer whose characteristics were obtained on specimens with artificial defects. Results are given of tests of the flaw detector on samples of satisfactory and defective articles. Figures 3; references 2: 1 Russian, 1 Western.

06415/06662

UDC 681:142

Optimization of Structure of Distributed Control Computer Systems
18600118k Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian Vol 30, No 1, Jan 87 (manuscript received 1 July 85), pp 27-32

[Article by G.L. Golovanevskiy and M.V. Kuryashov, Leningrad Institute of Precision Mechanics and Optics]

[Abstract] The article considers the criterion for synthesis of contro. computer systems which takes into account the consequence of failures of elements of the object plus control computer system, and enables an evaluation of a complex at an arbitrary interval of time. The article is recommended by the Department of Applied Mathematics. Figures 1; references: 1 Western.

06415/06662

UDC 536.6

TEM1 Series of Electronic-mechanical Heat Counters
18600112e Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 32-33

[Article by Engineers R.Z. Aloyev, G.s. Ter-Israyelov, and B.G. Brodskiy]

[Abstract] The article considers the TEM1 parametric series of electronic-mechanical heat counters developed by the Special Design Office for Petroleum Technical Instruments, Baku, and intended for measurement of the total amount of thermal energy and the heat carrier on the individual, group, or central inputs of closed (without removal of heat carriers) networks for the water supply of urban and rural residential and public buildings. The principles of operation of the IPKT1 standard converter which enters into the make-up of the TEM1 are described and the technical characteristics of the TEM1 are given. Figures 2.

06415/06662]

UDC 531.74.084.2

Transducer of Angular Rotations
18600112d Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 p 29

[Article by M.V. Lakomkin, engineer]

[Abstract] The article describes a transducer of angular rotations developed at the Kubyshev Aviation Plant, with the linear characteristic of the angle-voltage in the plus or minus 60 degree range, an error not exceeding 0.4

percent, and a resolution of plus or minus 2'. The external dimensions of the unit are 40 x 40 mm. This transducer is recommended for use in various devices used in automatics, telemechanics, and measuring technics. Figures 1.

06415/06662

UDC 621.384.3

Photodetection Device for Infrared Remote Control System
18600112c Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 p 32

[Article by Engineers V.A. Kononov and V.S. Alekhin]

[Abstract] The article discusses a photodetection device for an infrared remote control system. A block diagram is shown for a spark-safe photodetector for environments with explosion hazards. The technical characteristics of the device are given. Tests showed that for a photodetector device with a power of 180 mW the maximum operating distance was 25m, operation was possible in buildings of volumes up to 200 m^3 because of signal reflection while under underground conditions the range was 3-5 m.

06415/06662

UDC 620.179.1:620.165.29

Algorithimization of Control of Electric Motor Drive of Sirena-1 Self-propelled Flaw Detector
18600112b Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 1, Jan 87 pp 24-26

[Article by L.N. Lozovoy, candidate of technical sciences]

[Abstract] The article describes one of the most optimum algorithms of control of the electric motor drive of the Sirena-1 self-propelled flaw detector, based on a developed system of commands. Block diagrams of the algorithms are presented of the start and stop of the equipment in a prescribed position, switching on of X-ray radiation and analysis of the environmental parameters, as well as a description of the functional circuit of an assembly of detectors and the principal of decoding the command. Operation of the proposed algorithm is considered. Series production of the "Sirena-1" started at the Burevectnik Scientific Production Association (Leningrad). The equipment is the first robotics complex in the USSR for control of the quality of the welded seams of main pipelines during their construction. Figures 3; references 3: 2 Russian, 1 Western.

06415/06662

UDC 681.269.7:531.787

Crane Strain-measurement Scales With Data Processing by a Microprocessor
18600112a Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 11, Jan 87 pp 16-17

[Article by Ya. T. Dashevskiy, A.I. Kalinin, and V.A. Turetskiy, engineers; V.S. Karp and A.V. Lysyuk, candidates of technical sciences]

[Abstract] The Odessa Tochmash (Production Association) developed the series of crane electronic strain-measurement scales Type 4483 EKD with naximum limits of weighing, 5:10:30:32 tons, intended for suspension of various loads, and hoisting bridge cranes (not having a revolving trolley) with shut-down of the load during weighing. Crane scales for bridge cranes are considered in this article, in which a measuring instrument witi a built in microprocessor is used. An algorithm of the instrument's operation makes it possible to increase the precision of measurement, and to decrease the laboriousness of maintenance and alignment. A block diagram of the microprocessor is shown. Figures 1.

06415/06662

UDC 681.327

Minimization of the Permanent Memory Capacity of Microprogram Control Device Through Vertilization of Flow Chart Algorithm
18600118j Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY; PRIBOROSTROYENIYE in Russian Vol 30, No 1, Jan 87 (manuscript received 27 Jan 86) pp 23-27

[Article by A.a. Barkalov, Z.O. Dzhaliashvili, and V.N. Strunlin, Donetsk Polytechnical Institute]

[Abstract] The article proposes a method for optimizing the permanent memory capacity of a microprogram control device, based on "splitting" of the operational vertices of the interpreted flow chart of an algorithm. In this way, compatibility is obtained of all the microoperations, and the problem of optimum encoding of the operational part of the microcommand is simplified. An analytical evaluation is made of the proposed method and the method of encoding the combined microoperation fields, and the area of effective use of the proposed method is determined. The increase in the time for fulfillment of the algorithm is small. The article is recommended by the Department of Electronic Computing Machines. Figures 3; references 5: 4 Russian, 1 Western.

06415/06662

UDC 537.312.62:621.396.6

Comparative Analysis of Three Methods of tuning Two-Inductive Superconducting Quantum Interferometers

18600118e Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDEBIY: PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 25 Nov 85 pp 51-54

[Article by S.V. Arkhremenko, A.Yu. Petrov, and A.V. Filimonov, Novosibirsk Electrical Engineering Institute]

[Abstract] The article considers three methods of tuning two-inductance superconducting quantum interferometers (SQVI) at room temperature, which are distinguished by the design of the coil of the oscillatory circuit, inductively coupled with the SQVI. A comparative analysis is made of the sensitivity of these methods. The experimental results agree well with theoretical calculations. The article is recommended by the Department of Information Measuring Techniques. Figures 2; references 4: 3 Russian, 1 Western.

6415/12232

UDC 621.384.31

Optimization of Selection of Linear Decisive Limit in Two-channel Optoelectronic Detection Devices

18600118f Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 27 Sep 85) pp 69-73

[Article by D.S. Kozarev and G.I. Leshev, Leningrad Institute of Precision Mechanics and Optics]

[Abstract] The article evaluates a method for selection of the decisive limit in two-channel optoelectronic detection device (TODD) and a method is presented for selection of the optimum linear threshold limit. The method is applicable in the design of TODD with built-in microprocessors for data processing and analysis. The article is recommended by the Department Faculty (Kafedra) on Optoelectronic Devices. Figures 4; references: 3 Russian.

6415/12232

UDC 681.32

Digital Processing of Signals at Photodetector Output

18600118g Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 4 Oct 85) pp 73-80

[Article by V.I. Kalinchuk, Leningrad]

[Abstract] The article considers an algorithm for digital processing of signals at the photodetector output with the signals presented by a precise non-uniform filtered Poisson input. For known signal, noise and input circuit parameters the procedure can be realized by series-produced analogue/digital converter microprocessors or single-chip microcomputers. Figures 5; references: 3 Russian.

6415/12232

UDC 621.383.292.029.75

Dark Current and Noise of "Solar-Blind" Photomultipliers

18600118h Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 16 May 86) pp 81-85

[Article by V.A. Usachev, Kazan]

[Abstract] The article considers the basic components of dark current and the nature of anode current noise. A criterion for selection of photodetectors is proposed and the construction for fastening the FEU [photoelectric multiplier]-142 in an optoelectronic device for detection of vacuum ultraviolet is illustrated. A comparison of the experimental and calculated values of the anode current noise of the FEU-142 is also illustrated. Figures 4; references: 2 Russian.

6415/12232

UDC 531.8

Imitator of Visual Situation with Variable Contrast

18600118i Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian
Vol 30, No 1, Jan 87 (manuscript received 11 Mar 86) pp 86-89

[Article by N.F. Gusarova, A.V. Demin, and G.V. Polshchikov, Leningrad Institute of Precision Mechanics and Optics]

[Abstract] Imitators of a visual situation (IVS) are actively used during production and tests of optical and optoelectronic devices and device complexes, as well as during training of operators for their exploitation. A number of problems in contemporary complexes have stimulated the development of new IVS which assure imitation of a large number of the parameters of the visual situation and have improved precision. The present article proposes a scheme for construction of an imitator of visual situation with the possibility of a smooth change of the contrast of the image observed up to its conversion in an IVS. The article is recommended by the Department for Special Optical Devices. Figures 1; references: 9 Russian.

6415/12232

UDC 621.385.8.387

Microprocessor Installation for Measuring Parameters and Characteristics of Matrix Screens
18600174e Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received 11 Jul 86) pp 86-89

[Article by U.Yu. Usmonov and F.M. Yablonskiy]

[Abstract] The article describes a flexible microprocessors installation which makes it possible to measure the optical, time, and electrical parameters of matrix screens which are used for data display. This materially improves the quality of devices and the area of their application. Specific data are presented with respect to an installation used for investigation of modulation characteristics. A block diagram of the device is shown and the flow chart of the measurement algorithm is given. Figures 4; references: 2 Russian.

6415/12232

UDC 681.142.61:621.396.6

Design of Asynch[illegible]nous JK-Flip Flop Based On the And-Not Logical Elements

Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYA in Russian Vol 30, No 1, Jan 87 pp 32-36

[Article by M.V. Luchko, Lvov Trade and Economics Institute]

[Abstract] Functioning of an asynchronous JK-flip-flop as an asychronous finite automation is described by normal transfer tables and yields, and the design of its asynchronous sequence of circuits based on And-Not elements is presented. The article is recommended by the Department of Technology for Processing Economic Information. References: 10 Russian.

6415/12232

681.142.2

Mathematical Models of Buffer Stores with Group Access

18600118d Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian Vol 30, No 1, Jan 87 (manuscript received 21 Mar 86 pp 36-39

[Article by V.A. Popov, Leningrad Institute of Aviation instrument Engineering]

[Abstract] The article proposes and analyzes the organization of buffer stores using the group access method. Previously buffer stores delivered a single record but with access handling all messages accumulated in the store to this moment are accessed, i.e., it is completely cleared. The analysis uses a model which takes into account both the external parameters which characterize the flows of single record accessing and access handling, and the interior time parameters—the expenditure of time on recording and readout of one message which characterize memory reaction time. The article is recommended by the Department of Automated Control Systems. Figures 2; references: 3 Russian.

6415/12232

left spaces for an "unknown"]

UDC 621.396.67.001.24

Controlling Shape of Radiation Pattern in Energy Transmission Channel by Means of Microwave Beam

18600139p Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 10 Jun 86) pp 70-73

[Article by V.A. Vanke, S.K. Lesota, and A.V. Rachnikov]

[Abstract] The possibility of controlling the radiation pattern in the energy transmission channel of a solar space power system is examined, specifically controlling the direction of maximum radiation intensity, also in the case of a fixed wave parameter — = gpR_1R_2/glD (R_1 - radius of transmitter antenna, R_2 - radius of receiver antenna, D - distance between antennas, gl - radiation wavelength). For an analysis of the problem are determined variants of such a channel with maximum efficiency of energy transmission from the aperture of one antenna to that of the other by a microwave beam with a constant ratio of maximum power density within its cross-section to power density at its edge. The power density distribution in the plane of the receiver antenna is treated as a function of the radial coordinate, with the maximum power density not necessarily at the center. Another important control optimization criterion are two surface utilization factors characterizing the transmitter antenna and the receiver antenna respectively. On this basis, it appears to be feasible to suppress the side lobes of the microwave radiation field to below the USSR medical standard safety limit of 10 gmW/cm^2 in a more than 90

efficient energy transmission channel, with an up to 58

antenna surface utilization factor on the receiver side. Figures 3; references: 2 Russian.

02415/06662

UDC 621.396.621

Integrated-Circuit Version of Balanced Twin Wideband Microwave Mixer on Two-Conductor Transmission Lines

18600139o Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision, 17 Apr 86) pp 27-29

[Article by B.Ye. Pustovarov, V.A. Lukyanchuk, and O.N. Chesnokov]

[Abstract] An integrated version of a balanced twin microwave mixer with a bandwidth exceeding two octaves is described which includes compensated exponentially nonlinear transitions on two-conductor transmission lines matching the four-diode lattice. The chip topology and the equivalent circuit are shown, the latter including not only the input impedance of the transitions but also the series resistances of the diodes and the output inductance. Two-conductor transmission lines are preferable to coaxial microstrip lines, because they provide matching over a wider frequency range and they allow a higher degree of integration. Figures 2; references: 5 Russian.

02415/06662

UDC 621.394.662

Method of Block Synchronization of Alphabetical Codes for Digital Transmission Systems
18600174f Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received after revision 30 Jun 86) 56-60

[Article by G.S. Markaryan, G.G. Khachatryan, and L.G. Khachatryan]

[Abstract] A method of block synchronization for digital transmission systems is proposed which makes it possible to use all the synchronizing capacity of an alphabetical code. A synchronization protocol is described using to full synchronization capacity of the code and a realization of the block synchronization system is described and illustrated into a block diagram. The parameter for code synchronization is used as a criterion and a procedure for parameter evaluation is described allowing comparison of codes. An evaluation is given for the currently used 6V-4T code. Figures 2; references 10: 6 Russian, 4 Western (1 in Russian translation).

6415/12232

UDC 681.325.3:621.396.62

Sampling and Storage Integrator with Large Dynamic Range
18600174d Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 pp 24-27

[Article by Ye.S. Poberezhskiy, M.V. Zarubinskiy and V.D. Zhenaton]

[Abstract] In connection with digital radio receiving devices, results are presented of an experimental investigation of the dynamic range of a sample sampling and storage integrator realized by means of series-produced microcircuits and intended for digitization of narrow-band oscillations. A block diagram of the integrator is shown and described. An evaluation is given of the factors affecting the dynamic range of these devices. The circuit used for measuring the dynamic range is shown. Figures 4; references: 5 Russian.

6415/12232

621.397.23.092.2.08:629.783

Noncoordinate Method for Determining Transmission Time for Satellite Television Channels
18600146a Moscow IZMERITELNAYA TEKHNIKA in Russian No 2, Feb 87, pp 31-32

[Article by Yu.A. Fedorov, Yu.D. Ivanova, and A.I. Pavelev]

[Abstract] A method is considered for determining the transmission time for satellite television channels which does not require knowledge of the earth satellite coordinates. According to the values of the transmission time measured at the check point the time of distribution as far as the reception point is determined with an error of 1-23 microseconds. An analysis is made of the error connection with long-duration measurements of the location of the earth satellite. Figures 2; references: 3 Russian.

6415/12232

UDC 621.396.2

Interference Immunity of Two-Link Communication System with Elimination of Narrow-Bank Interference in Radio Relay
18600139m Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 pp 47-48—[Annotation of article no 940-sv deposited at Central Scientific and Technical Institute 'Informsvyaz,' 9 pp with 4 figures and 7 bibliographical references]

[Article by A.V. Kuzichkin and B.I. Prosenkov]

[Abstract] Shielding a two-link communication system with direct radio relaying of pseudorandom signals against narrow-band interference in the relay by means of a "bleaching" filter is considered, such a filter consisting of a module for detection of narrow-bank interference signals and a module for elimination of corresponding bands from the spectrum of pseudorandom signals. The detection module has n_d parallel identically wide frequency channels and the elimination module has n_e controllable identical sections with the same bandwidth, such that only one interference frequency band falls within any one detection channel and notching section. The interference immunity of a two-link communication system with such a filter is evaluated on the premise that the radio relay operates in the mode of stiff limiting, that the relay input signals are phase keyed, that they appear mixed with Gaussian noise and harmonic interference, that the relay output signals are mixed with Gaussian noise, that the notching filter sections are ideal, and that the radio receiver is a correlational one with ideal locking. The interference detection probability and the false-alarm probability are calculated for one partial filter frequency channel, analytically for the general case and numerically for a pseudorandom signal appearing with 10 harmonic interference signals.

2415/12232

UDC 621.391

Signal-to-Noise Ratio at Output of Acoustooptical Device for Forming Interferograms

18600174h Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received after revision 29 Mar 1986) pp 79-82

[Article by V.A. Golub]

[Abstract] The recording of amplitude-phase spectra in real time by bolographic methods presents problems and the interferogram method is considered an alternative. The article demonstrates that during processing of the radio signal of an acousto-optical device for forming interferograms, the presence of additive noise leads to the appearance at its output of nonstationary optical background noise, the mean value of which contains a component oscillating with a frequency equal to the difference of the frequencies of the controlling oscillations of the deflectors. The analytical ratios obtained make it possible to evaluate the background noise level, and to determine the signal-to-noise level at the output of the acousto-optical device for forming interferograms. REferences: 5 Russian.

06415/06662

UDC 621.391:621.396.1

Electromagnetic Compatibility in Model of Electronic System

18600139n Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 11 May 86) pp 3-8

[Article by B.Kh. Kharlov and N.D. Kombakov]

[Abstract] A multilevel model of an electronic system is constructed by the hierarchical procedure, taking into account its complexity and the totality of all elements including control devices. It is then represented as a standard black box with a set of input signal, a set of control signals, and two sets of output signals related through a real vector in the space of states as functions of time. On the basis of this model is established the EMC space for system elements, for analysis and synthesis of the system. the steps to ensure electromagnetic compatibility are accordingly structurization of the system and simulation of interactions of elements with analysis of their frequency distribution at the lowest level. This is followed by conversion of signals, for determination of the state of each element at a fixed instant of time, then construction of the EMC space of input-output signals for each system element and scanning for the condition of orthogonality. Next follow construction of the EMC space of converted input signals, calculation of the EMC factor for the system, and, after the system has been checked for orthogonality, determination of other incidental EMC estimates. Figures 3; references: 4 Russian.

2415/12232

UDC 62-592.35.001.24

Mechanical Characteristics of Electromagnetic Brake With a Cylindrical Ferro-Magnetic Copper-Plated Rotor
18600120e Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA in Russian No 1, Jan 87 pp 54-61

[Article by Leonid Alekseyevich Potapov, candidate of technical sciences, assistant professor, Bryansk Institute of Transportation Machine Construction]

[Abstract] The analytical dependence of the moment of an electromechanical brake with a cylindrical ferromagnetic copper-plated rotor versus the frequency of rotation, the geometrical dimensions, and other constructional factors is obtained on the basis of electromagnetic field theory. As a special case of this dependence, formulas are obtained for the moments of an electromagnetic brake with massive and hysteresis rotors. These formulas were checked by comparing the calculated mechanical characteristics with the experimental. The good correspondence of the experiments and calculations bear witness to the accuracy of the equations and the advisability of their use in engineering practice. Figures 5; references: 6 Russian.

06415/06662

UDC 621.3.01

Grid Model of Periodic Processes of Generalized Static Electromagnetic Energy Converter With Bar Magnetic Circuit
18600120d Novocherkassk IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA in Russian No 1, Jan 87 (manuscript received after revision, 29 Sep 86) pp 33-39

[Article by Roman Vladimirovich Filts, doctor of technical sciences, senior scientific research worker, Institute of Applied Problems of Mechanics and Mathematics, USSR Academy of Sciences, and Orest Vladimirovich Sr nchishin, senior engineer, Institute of Applied Problems of Mechanics and Mathematics, USSR Academy of Sciences]

[Abstract] Modelling of a generalized static energy converter is required for design purposes. The article proposes an algorithm for calculation of the periodic processes in a device consisting of a bar magnetic circuit with an arbitrary scheme of a magnetic circuit and a set of windings connected to an arbitrary electrical circuit. The algorithm was realized in FORTRAN-IV for a Yes-1060 computer. Reference: 6 Russian.

06415/06662

UDC 621.318:538.26

Linear Displacement Sensor Based on the Hall Effect and Phi-shaped Magnetic Lens
18600118l Leningrad IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: PRIBOROSTROYENIYE in Russian Vol, 30, No 1, Jan 87 (manuscript received 2 Jan 85) pp 55-58

[Article by V.I. Prokoshin and V.G. Shepelevich, Belorussian State University imeni V.I. Lenin]

[Abstract] The article considers the design of a linear displacement sensor based on the Hall effect and a phi-shaped magnetic lens made up of a magnetic circuit in the form of a ring, and permanent magnets, in which a moving rod consisting of alternating ferromagnetic and nonferromagnetic disks causes a periodic change of the induction of the magnetic field close to the surface of the permanent magnets. The effect of the lateral displacements of the moving rod and the external magnetic fields on the change of the components of the magnetic induction in the gap of the linear-displacement transducer is investigated. The article is recommended by the Department of the Physics of Solids. Figures 3; reference: 1 Russian.

06415/06662

UDC 621.373.121

Use of Functional Iterations for Analysis of Oscillatory Processes in Fiber-Optical Self-excited Oscillator

18600174g Moscow RADIOTEKHNIKA in Russian No 3, Mar 87 (manuscript received 25 April 1986) pp 76-79

[Article by B.G. Gorshkov and A. Yu. Kuzin]

[Abstract] The article considers the use of modified functional iteration equipment for analysis of the oscillatory processes in self-excited oscillators, which makes it possible by simple methods to model a regime of stochastic oscillations. The apparatus consisted of a photodiode, amplifier, laser, spectrum analyzer, oscillograph and light guide. Modelling of the chaotic oscillation made is useful for investigation of the structure of a strange attractor in a self-excited oscillator and for determination of stochastic regimes, which are undesirable during practical employment of a self-excited oscillator. Figures 4; references: 10 Russian

06415/06662

UDC 621.317

Signal-to-Noise Ratio in Optical Spectrum Analyzer With Time Integration

18600139q Moscow RADIOTEKHNIKA in Russian No 1, Jan 87 (manuscript received after revision 27 May 86) pp 82084

[Article by A.F. Bukhenskiy, S.V. Morozov, and V.I. Yakovlev]

[Abstract] The noise in an optical spectrum analyzer with time integration of the light intensity distribution is evaluated, such an analyzer having a much better resolution than one with space integration of the light intensity distribution. Processing of an optical signal diffracted in the first order involves its transfer from the acousto-optic modulator to the photosensitive surface of a charge-coupled device, onto which is also projected a reference light wave with rotating phase front. The signal-to-noise ratio here is calculated by the energy method, assuming a finite frequency band of the optical signal and a very short transit time for an acoustical wavefront through the modulator relative to the optical signal recording time so that noise charge constitutes the principal interference. An expression is obtained as a result which indicates that the signal-to-noise ratio can be maximized by adjustment of the "exposure ratio" (amplitude of optical signal wave squared to amplitude of reference wave squared) according to the power within the envelope of the analyzed optical signal. Figures 3; references 4: 1 Russian, 3 Western.

02415/06662

UDC 621.396.967.029.7

Concerning Optimum Choice of Parameters of the Receiver-Transmitter of Laser Scanning System

18600093m Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 31, No 11, 86 (manuscript received 30 May 1983; after correction, 30 Dec 1985) pp 2255-2260

[Article by V.N. Gomzin, L.A. Lishvinchuk, and A.P. Naumov]

[Abstract] On the basis of a spatial-frequency analysis, the errors are considered of measurement of the heights of surface irregularities by a laser scanning system (LSS) measuring distance by the phase method, it is shown that for a surface with known statistical characteristics, parameters of a LSS can be selected, with which errors of measurements, depending both on the effect of spatial filtering and on the precision of evaluation of the phase of the intelligence signal during Gaussian noise, are minimal. A block diagram of the LSS is presented. Figures 2; references: 10 Russian.

06415/06662

UDC 539.216.22

Structural Transformations in Amorphous SiO_2 Films Bombarded by Medium-energy Ions
18600138a Moscow MIKROELEKTRONIKA in Russian Vol 16, No 1, Jan 87 (manuscript received 10 Dec 85) pp 89-91

[Article by V.A. Danilov and A.V. Rakov, Institute of General Physics, USSR Academy of Sciences]

[Abstract] An experimental study was made concerning changes in the optical absorption spectrum of SiO_2 films within the 900-1200 cm^{-1} band upon their bombardment by medium-energy ions, this band corresponding to asymmetric vibration of the Si-O-Si bridge bond. Specimens of 0.23 um thick films were produced by thermal oxidation of Si wafers in a moist O_2 atmosphere at a temperature of 1100SDC and then etched on one side before being bombarded with 50 keV $^{14}B^+$ ions and 100 keV $^{31}P^+$ ions in doses of 10^{12}-10^{16} ions/cm^2. The absorption spectra before and after bombardment were measured with a SPECORD 75 IR spectrometer. The shifting of the absorption peak toward higher frequencies with increasing bombardment dose indicates a higher concentration of induced structural defects. A theoretical analysis of the results in the approximation of a Si-SiO_2 system with otherwise similar optical properties before and after bombardment explains those structural transformations as being caused not only by formation of Frenkel-pair defects upon transfer of elastic energy from ions to target atoms with attendant breakup of bonds and knockout of atoms but also by anharmonic vibrations of bound atoms upon collisions involving transfer of less elastic energy than the threshold for formation of Frenkel-pair defects. After relaxation of these vibrations, the system may find a metastable new equilibrium. Figures 2; references 7: 4 Russian, 3 Western.

02415/06662

UDC 621.382.8

Limiting Values of Basic Parameters Characterizing High-speed Superlarge-scale Integration with Field Effect Transistors
18600138b Moscow MIKROELEKTRONIKA in Russian Vol 16, No 1, Jan 87 (manuscript received 28 Mar 86) pp 3-14

[Article by K.A. Valiyev, V.A. Kaminskiy, and A.a. Kokin, Institute of General Physics, USSR Academy of Sciences]

[Abstract] Design and performance of superlarge-scale integration on the basis of field-effect transistor gates are examined from the standpoint of physical characteristics and engineering criteria. Three types of field-effect transistors for circuit integration are compared, namely silicon MOSFETs, Schottky-barrier FETs, and selectively-doped heterostructure FETs. Their basic physical characteristics are channel length and channel width, threshold voltage determining the reliability, breakdown voltage limiting the supply voltage, switching work, and effective drift velocity of charge carriers. The engineering criteria for their integration are packing density and mean length of coupling lines. An analysis of applicable theoretical relations and available numerical data indicates ways to increase the switching speed and the attainable limits in terms of circuit dimensions and layout for necessary charge carrier transfer and heat dissipation. Tables 3; references 38: 20 Russian, 18 Western (2 in Russian translation).

02415/06662

UDC 535.318:621.382.8

Lens-screen Modules for Organization of Optical Interconnections in Superlarge-scale Integration Systems
18600138c Moscow MIKROELEKTRONIKA in Russian Vol 16, No 1, Jan 87 (manuscript received 22 May 86) pp 87-89

[Article by G.G. Golenko, I.N. Dyuzhnikov, M.I. Yelinson, and V.G. Komar, Institute of Radio Engineering and Electronics, USSR Academy of Sciences]

[Abstract] The feasibility of organizing optical interconnections with branching in SLSI systems by means of lens screens is examined on the basis of theoretical considerations pertaining to dimensioning and layout as well as engineering data on diaphragm arrays operating in transmitted light. The main advantage of optical interconnections and branching is the small channel length, with consequently negligible losses and dispersion. Reliability and fidelity of signal transmission are, however, subject to more stringent requirements. A major problem is matching this technology with microchip performance requirements so as to ensure compatibility of optical channels, which calls for coordinated design and layout of microcircuit electronics and optical components. Continuous-wave semiconductor laser with up to 50 mW power rating and modulation at gigahertz frequencies are most suitable for operation with fiber optics. The maximum number of fiber-optic channels a laser beam can be split into depends on the laser power, losses in the system, the required transmission rate, and the photoreceiver sensitivity, also on the interference immunity of channels typically binary ones with Gaussian noise. Figures 2; references: 3 Western.

02415/06662

END

END OF FICHE

DATE FILMED

29 Feb. 88